ERVCCSVA1100 ERVCCSHA1100
HRVCCSVA1100 HRVCCSHA1100

ENERGY/HEAT RECOVERY VENTILATOR

Carrier®
Turn to the Experts℠

Installation, Start-up, and Operating Instructions

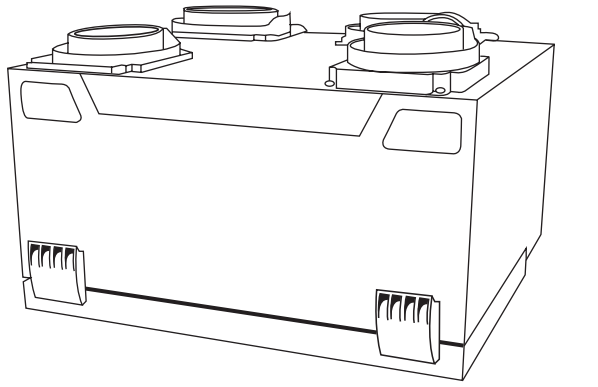

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Fig. 1 - ERV/HRV Unit (Top Port)

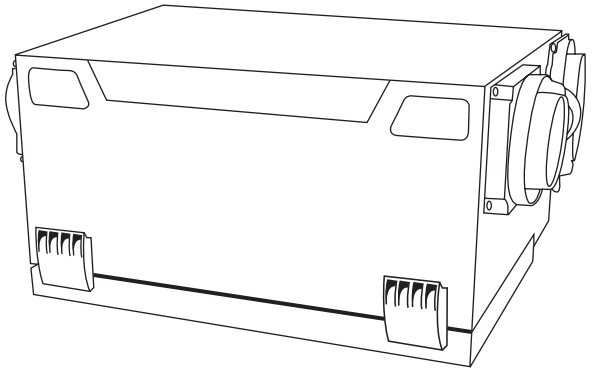

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Fig. 2 - ERV/HRV Unit (Side Port)

NOTE: Read the entire instruction manual before starting the installation.

SAFETY CONSIDERATIONS

Installation and servicing of this equipment can be hazardous due to mechanical and electrical components. Only trained and qualified personnel should install, repair, or service this equipment.

Untrained personnel can perform basic maintenance functions such as cleaning and replacing air filters. All other operations must be performed by trained service personnel. When working on this equipment, observe precautions in the literature, on tags, and on labels attached to or shipped with the unit and other safety precautions that may apply.

Follow all safety codes. Installation must be in compliance with local and national building codes. Wear safety glasses, protective clothing, and work gloves. Have fire extinguisher available. Read these instructions thoroughly and follow all warnings or cautions included in literature and attached to the unit.

Recognize safety information. This is the safety-alert symbol ⚠ When you see this symbol on the unit and in instructions or manuals, be alert to the potential for personal injury.
Understand these signal words; DANGER, WARNING, and CAUTION. These words are used with the safety-alert symbol. DANGER identifies the most serious hazards which **will** result in severe personal injury or death. WARNING signifies hazards which **could** result in personal injury or death. CAUTION is used to identify unsafe practices which **may** result in minor personal injury or product and property damage. NOTE is used to highlight suggestions which **will** result in enhanced installation, reliability, or operation.

INTRODUCTION

The Energy/Heat Recovery Ventilator (ERV/HRV) is used to exchange indoor stale air with outside fresh air. The unit is equipped with a special energy/heat recovery core which transfers both sensible and/or latent heat between the fresh incoming air and stale exhaust air. The cross-flow design core allows entering and leaving air streams to transfer heat and/or latent energy without mixing (See Fig. 14).

The model operates at 2 airflows, 50 CFM in low speed and 100 CFM in high speed. This unit comes in two configurations, vertical or horizontal. Special attention should be given to duct application, balancing the ERV/HRV, and locating unit for easy access and routine maintenance.

INSTALLATION CONSIDERATIONS

Step 1.—Inspect Equipment

Move carton to final installation location. Remove ERV/HRV from carton taking care not to damage unit. Remove all packaging and inspect unit for damage. Remove parts bag from inside unit. File claim with shipping company if shipment is damaged or incomplete. Check to make sure ERV/HRV unit matches Fig. 1 or Fig. 2.

Step 2.—Select Location

The ERV/HRV **should be located in a conditioned space** and in close proximity to a fused power source. It should be easily accessible for routine maintenance.

If ERV/HRV is installed independent of a forced-air system, unit should be located near the center of the air distribution system. If ERV/HRV is installed in conjunction with a forced-air system, unit should be located next to (or close to) the indoor equipment.

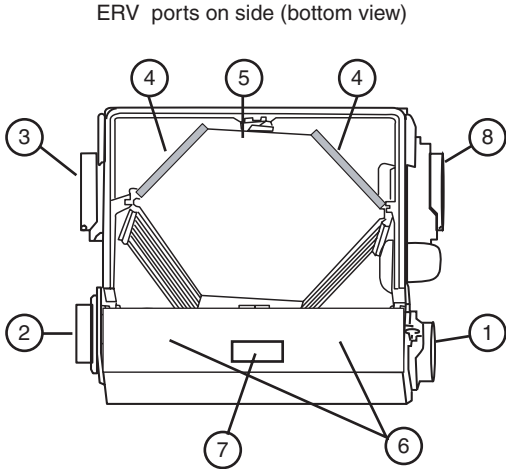

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Fig. 3 - Conventional Horizontal Unit

COMPONENT DESCRIPTION

The following listed items are components of HRVCCLHA (See Fig. 3).

1. Stale air return from building connected to return-air duct system.
2. Fresh-air intake connected to outdoor air inlet hood.
3. Exhaust-air connected to outdoor air exhaust hood.
4. Mechanical filters trap dust contained in the air.
5. Heat recovery core is a cross-flow type. The core transfers heat between the 2 air streams.
6. Blowers bring in fresh-air from outside and exhaust stale-air to outside.
7. Electronic control circuit ensures proper unit operation.
8. Fresh-air supply from HRV connected to return-air duct of forced-air system.
9. See Fig. 9 for terminal connector block for wiring wall and timer contorls.

UNIT INSTALLATION

⚠ CAUTION

UNIT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage or improper operation.

Do not install ERV/HRV in a corrosive or contaminated atmosphere.

Step 1.—Mount Unit

The ERV/HRV can be suspended from floor joists using chains and 4 springs. Attach metal hanging bracket to all 4 sides of cabinet (See Fig. 4). The unit may be installed on a shelf if an isolation pad is provided to dampen vibration. Unit should always be installed as level as possible.

Step 2.—Independent System Application

In the absence of a forced-air system and a typical duct system layout, the ERV/HRV can be applied as an independent or stand alone unit. To ensure comfort, this type of application involves running both fresh-air and return-air registers (or stale-air pickup registers) throughout the home.

Fresh-air registers are normally located in bedrooms, dining room, living room, and basement. It is recommended that registers be placed 6 to 12 in. from the ceiling on an interior wall and airflow directed toward ceiling. If registers are floor installed, airflow should be directed toward the wall.

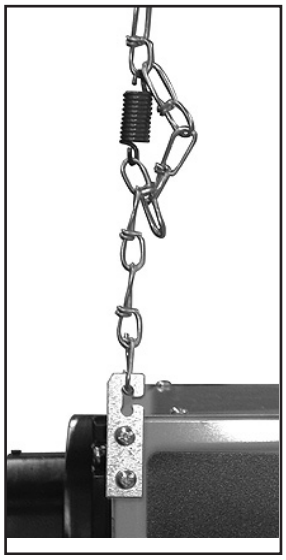

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Fig. 4 - Chain Spring Installation

⚠ WARNING

CARBON MONOXIDE POISONING HAZARD

Failure to follow this warning could result in personal injury or death.

Do not install return-air registers (or stale-air pickup registers) in same room as gas furnace or water heater.

Return-air (or stale-air pickup registers) are normally located to draw from kitchen, bathroom, basement, or other rooms where stale-air can exist.

Proper size and type of registers must be used to minimize pressure drop. The velocity of airflow through register should not be above 400 ft/minute.

Maximum length of duct for the system should be designed according to the highest speed of the unit. Refer to specifications listed in unit Product Data Digest for ventilation capacities.

Step 3.—Forced-Air Application

Most ERV/HRV applications will be installed in conjunction with new or existing forced-air system. To operate properly, the fresh-air supply and stale-air return from ERV/HRV connect directly to return-air duct system. This is how the ERV/HRV distributes fresh air and removes stale air from inside of building (See Fig. 7). For these installations, furnace or fan coil blower must be interlocked and operate continuously whenever ERV/HRV is energized.

NOTE: The fresh air from ERV/HRV is introduced into return-air duct at a point no less than 10 ft upstream of furnace or fan coil. This connection should be direct (See Fig. 7). This is to allow incoming fresh-air to mix before entering indoor equipment.

Step 4.— Connect Ducts to ERV/HRV

⚠ CAUTION

PROPERTY DAMAGE HAZARD

Failure to follow this caution may result in minor property damage from sweating duct or loss of unit efficiency and capacity.

If ERV/HRV duct work is installed in an unconditioned space, insulated flexible duct is required.

Insulated flexible duct is required on both fresh-air inlet and exhaust-air outlet ducts connecting to exterior wall. When using insulated flexible duct, the vapor barrier of the flexible ducts must be taped very tight to prevent condensation problems. To reduce pressure drop, stretch the flex duct and support it in a proper manner to avoid reduced airflow.

When connecting the ERV/HRV to a return-air duct system, insulated flexible duct can be used. However, when metal or rigid ducts are applied use approximately 18-in. of flexible duct at ERV/HRV ports for fresh-air supply, and stale-air return. When using metal duct from fresh-air supply to system duct work, the metal duct should be insulated (See Fig. 5). This can act as a silencer when connecting ducts to return-air duct system. This should eliminate transmission of noise or vibration from unit to main duct system.

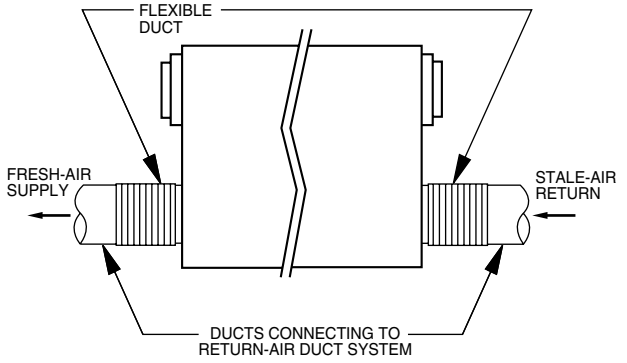

Fig. 5 - Flexible Duct Fit-Up

Step 5.—Locate and Install Exterior Hoods

IMPORTANT: To prevent condensation problems, insulated flexible ducts are required on both fresh-air inlet and exhaust-air outlet ducts connecting between ERV/HRV and exterior wall.

Fresh-air intake and stale-air exhaust must be separated by at least 6 ft. Fresh-air intake must be positioned at least 10 ft. from nearest dryer vent, furnace exhaust, driveway, gas meter, or oil fill pipe. Fresh-air intake must be positioned as far as possible from garbage containers and potential chemical fumes. When possible, it is advised to locate the intake and exhaust hoods on same side of house or building. The intake and exhaust hoods should never be located on interior corners or in dead air pockets (See Fig. 7). Both intake and exhaust hoods must be 18 in. from ground and at least 12 in. above anticipated snow level.

After selecting proper hood locations, make appropriate size hole through exterior wall, pass flexible duct through hole and insert hood tube into duct. Tape duct vapor barrier tightly around hood tube and insert assembly back into wall and fasten securely.

Step 6.—Condensate Drain

(For ERV, skip Step 6 and continue to Step 7.)

To connect condensate drain, proceed as follows:

1. Punch out holes in foam insulation and door, then insert sleeved grommets into bottom of unit using the gasket washer and nut (See Fig. 6).
2. Cut two sections of plastic tubing, about 12" long and attach them to each drain.
3. Join the two short sections of plastic tubing to the "T" connector and the main tube as shown.
4. Make a loop in the tubing below the "T" connector to create a trap to prevent sewer gases from entering the ventilation system (See Fig. 6).
5. Connect unit drain to building's main drain. Provide slight slope from unit for run-off.

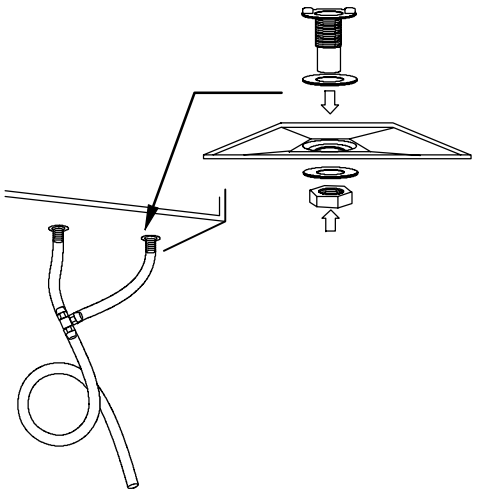

Fig. 6 - Condensate Drain With Loop Trap (HRV Only)

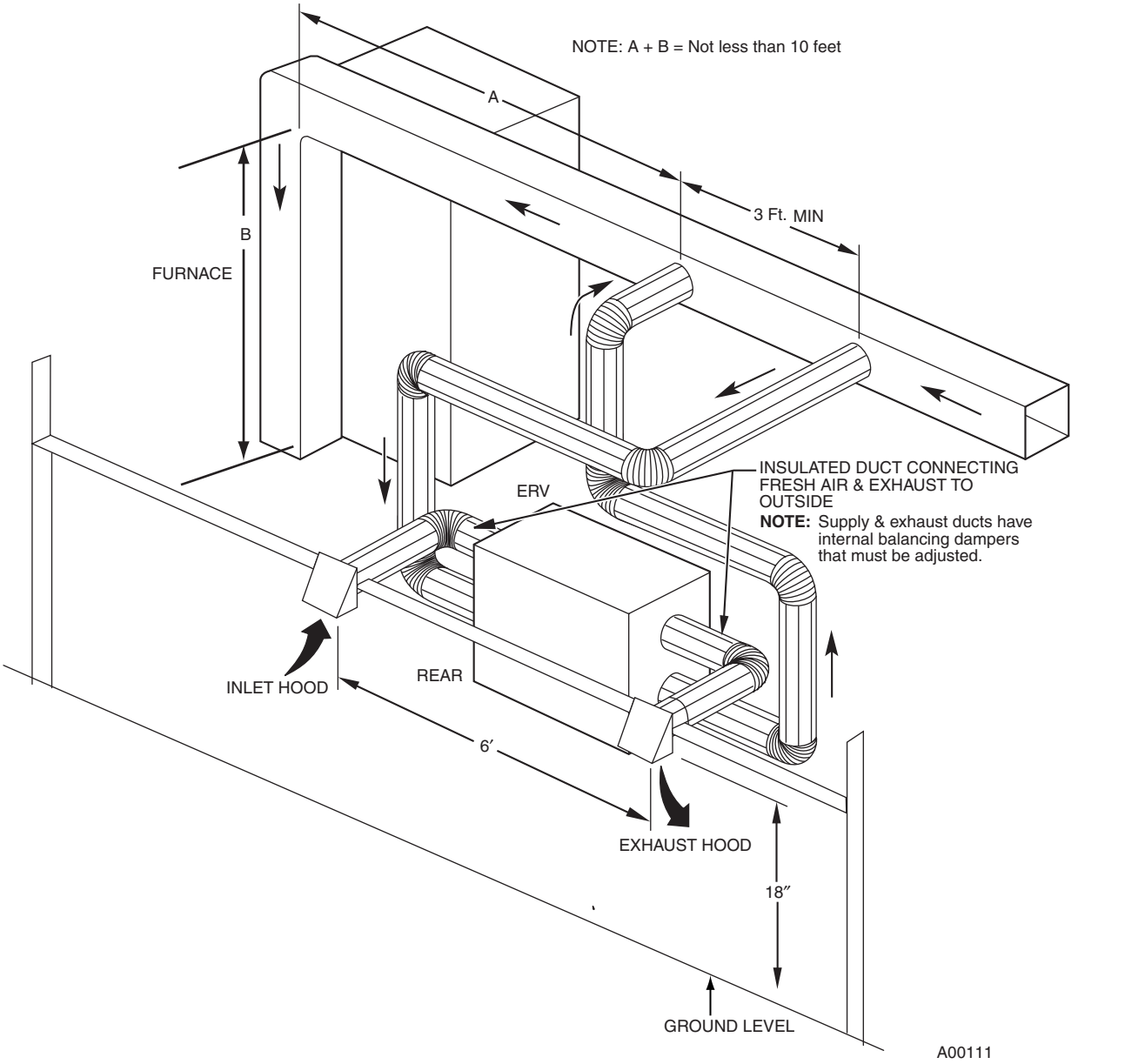

Fig. 7 – Exhaust Ventilation

WALL CONTROL

Step 1.—Location

The ERV/HRV wall control is unique to this unit. The ERV/HRV will not operate without it. This control senses humidity not temperature. It must be located in an area where it will continually monitor fresh air circulating within the home. Install ERV/HRV wall control as close as possible to main system thermostat and follow same guidelines as installing a thermostat (locate approximately 5 ft. above floor, mount on an inside partitioning wall, etc.)

Step 2.—Wiring

Remove top cover assembly from wall control and pass thermostat wire through hole located on back of control before attaching to wall. Connect Y, R, G, and B (yellow, red, green, and black) between wall control and ERV/HRV connector following color code (See Fig. 8 and 9). Replace top cover assembly. In Fig 9, item A shows a correctly inserted wire, item B shows an incorrectly inserted wire.

NOTE: ERV/HRV wall control and circuit board operate on 12vdc.

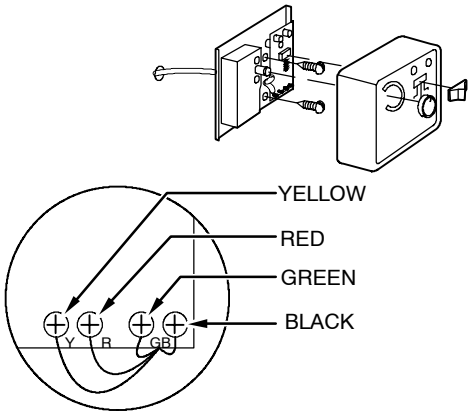

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Fig. 8 - Typical Wall Control

Step 3.—Operation

The ERV/HRV wall control has 4 basic modes of operation, OFF, LOW, HIGH, and INTERMITTENT. Be sure that all modes of operation are fully functional. See Table 1 indicating standard control operation.

1. With switch off, ERV/HRV is inoperative and the LED is out.
2. With switch on LOW, ERV/HRV continuously exchanges air with outside. If control is satisfied, blower will run in low speed, otherwise, blower will run on high speed. The LED is illuminated all the time.
3. With switch on INTERMITTENT, the ERV/HRV exchanges air with outside on high-speed blower, and unit shuts down when control is satisfied. The ON LED is illuminated all the time, and AIR EXCHANGE LED is illuminated only when unit is running. This mode is ideal for maintaining proper humidity levels when no one is home.

Step 4.—Humidity Selector

The humidity selector is a built-in control designed to properly control the level of humidity in the house during the winter months. This control helps avoid condensation problems in upper northern regions where indoor humidity is a problem during the winter season.

NOTE:This control is not to be confused with a dehumidistat used during the summer months to control high relative indoor humidity.

Table 2 recommends humidity levels to avoid condensation.

Step 5.—OneTouch Control

The OneTouch control can be used as the primary wall control for the ERV/HRV. This control will step through the modes of operation with consecutive presses of the button. The LED indicates which mode is currently selected, Off, Intermittent, Low, or High.

Step 6.—Latent Control

NOTE: To ensure highest degree of humidity control in cooling season, the INTERMITTENT mode should be used. See Table 1 and reference LOW and INTERMITTENT control operation listed above.

NOTE: The ERV/HRV may be controlled using the Infinity system control. The ERV/HRV may be connected using either a NIM or a 4-Zone Damper Module. See the appropriate instructions if using the NIM of a 4-Zone Damper Module for connection instructions.

The Infinity system control will simultaneously control the ERV/HRV and the indoor blower.

Push Button Timers may be used and are connected to the ERV/HRV. However, the Infinity system should be set to continuous fan to ensure that the fresh air is circulated in the home. In a Zoned System, at least one zone should be set to continuous fan.

OPERATING THE ERV/HRV WITH THE INFINITY CONTROL

The ventilator has four settings in heating mode and three settings in cooling mode.

Heating:

AUTO - the ventilator selects the speed based on indoor humidity and outdoor temperature. It may cycle on/off every 30 minutes depending on humidity and outside temperature.

LOW - low speed all of the time.

HIGH - high speed all of the time.

DEHUM - will only turn on if humidity is 3% over set point. The speed is determined by indoor humidity and outdoor temperature.

Cooling:

AUTO - the ventilator selects the speed based on indoor humidity and outdoor temperature. It may cycle on/off every 30 minutes depending on humidity and outside temperature.

LOW - low speed all of the time.

HIGH - high speed all of the time.

If the fan speed is set to Auto and the ventilator wants to run, the fan speed will run at High continuous speed. Otherwise, the fan will stay at the chosen continuous fan speed.

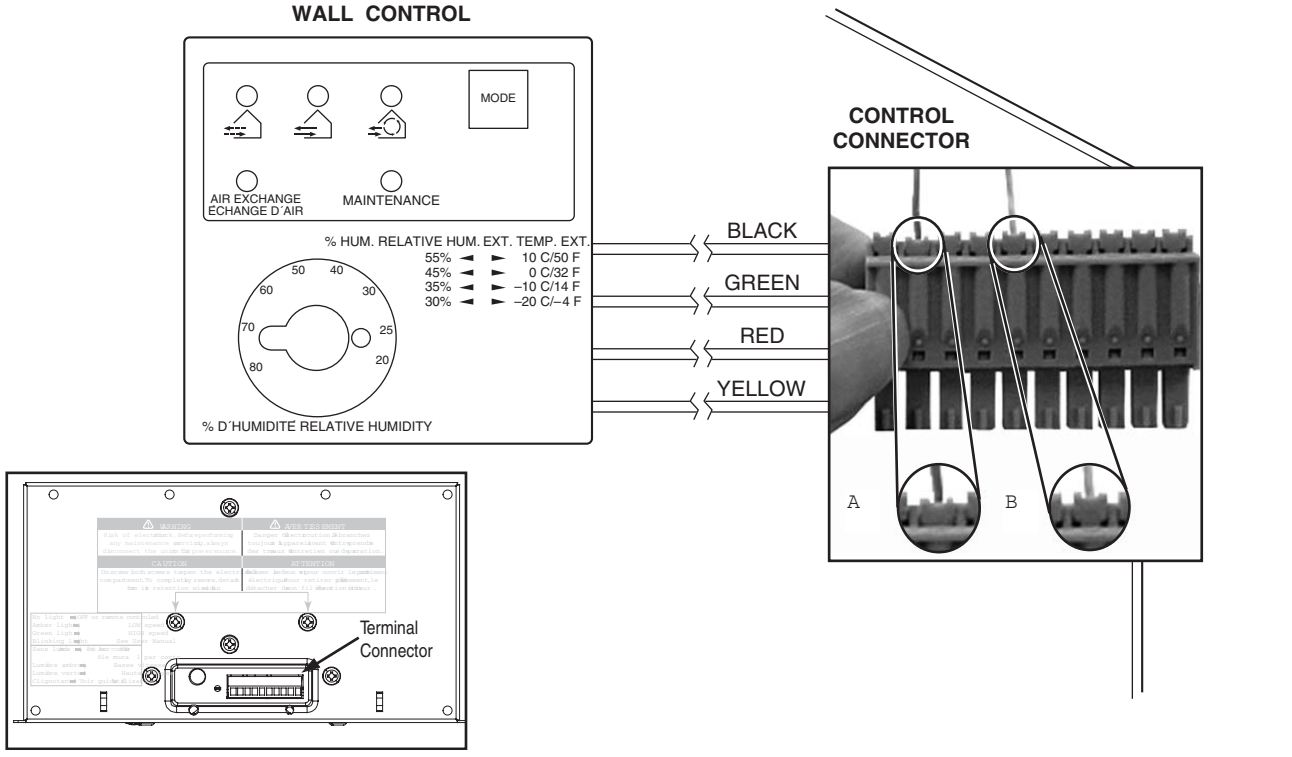

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Fig. 9 - Control Connector

Table 1—Basic Control

MODE	OPERATION	DAMPER POSITION	FAN SPEED
Off	Off	Closed to outside	Off
Low	Air exchange with outside	Open to outside	Low
Intermittent	Air exchange with outside	Open to outside	Low
High	Air exchange with outside	Open to outside	High

Table 2—Recommended Humidity Levels

OUTSIDE TEMPERATURE		DOUBLE–PANE WINDOWS	TRIPLE–PANE WINDOWS
50° F	10° C	55 percent	65 percent
32° F	0° C	45 percent	55 percent
14° F	–10° C	35 percent	45 percent
–4° F	–20° C	30 percent	45 percent
–22° F	–30° C	25 percent	35 percent

ELECTRICAL CONNECTIONS

1. 115-vac Wiring

The ERV/HRV operates on 115vac. It comes with a power cord attached to unit and ready to plug into a fused outlet. Unit must be grounded for proper operation.

All electrical connections must comply with National and Local Electrical Codes, or other ordinances that might apply.

⚠ WARNING

ELECTRICAL SHOCK / FIRE HAZARD

Failure to follow this warning could result in personal injury, death and/or property damage.

Do not use an extension cord as a power source for operating the ERV/HRV.

2. 12-vdc Wiring

The ERV/HRV circuit board, wall control, and accessories operate on 12vdc. See Wall Control section, item Wiring and Fig. 8 and 9 for more information.

ACCESSORIES

1. 20 Minute Timer

A push button timer can be used to override the wall control and put the ERV/HRV into high speed for 20 minutes. Connect switches in parallel and connect leads to ERV/HRV terminals I, OC, and OL (See Fig. 12). Push button locations are ideal in special activity areas, such as, bathroom, or kitchen, where high-speed exhaust operation is needed for a short period of time.

NOTE: The 20 minute timer will not function properly unless ERV/HRV wall control is applied and working correctly. Timing function is internal to electronic circuit board, it is activated by a momentary contact between OC and OL. The I connection is to illuminate the push button. The maximum number of push button timers that can be applied is 5.

2. 60 Minute Adjustable Timer

A 60 minute adjustable timer can also be used to override wall control and put HRV into high-speed operation for a select amount of time. Connect timer in parallel with push button timers, or to ERV/HRV terminals OC and OL (See Fig. 12).

The 60 minute timer will provide a minimum of 10 minutes, and a maximum of 60 minutes of ventilation at high speed.

BALANCING ERV/HRV

Balancing intake and exhaust airflow is very important for proper system operation and optimum performance when applying an ERV/HRV. Unit balancing prevents a positive and/or negative pressure within the home. Balancing the ERV/HRV is done by applying magnehelic gage and balancing dampers to the fresh air intake and stale air exhaust ducts (See Fig. 11).

Airflow is temporarily determined by connecting a magnehelic gage to the pressure taps on ERV/HRV (See Fig. 13). Balancing chart is located on unit door.

If supply-air from outside is greater than exhaust-air from the house, an imbalance can result over pressurizing the home. If exhaust-air is greater than supply-air, combustion appliances may backdraft, bringing exhaust fumes into the house. A balanced condition will ensure optimum performance, provide satisfied customers, and avoid expensive callbacks.

Before proceeding with balancing, all windows, doors, and fireplace flues should be tightly closed. No exhaust systems such as range top exhausts, dryer exhaust, fume hoods, bath or roof fans should be in operation. The forced-air furnace (if used for circulation) should be operating in continuous fan mode for normal operating speed.

Step 1.—Balancing Dampers

Balancing dampers (sometimes called butterfly dampers) are located in fresh-air intake and stale-air exhaust of the ERV/HRV. (See Fig. 13). Some field modification may be required to ensure proper installation of balancing dampers while located in flexible duct. Insulating over these dampers is strongly recommended after balancing is complete to prevent condensation problems.

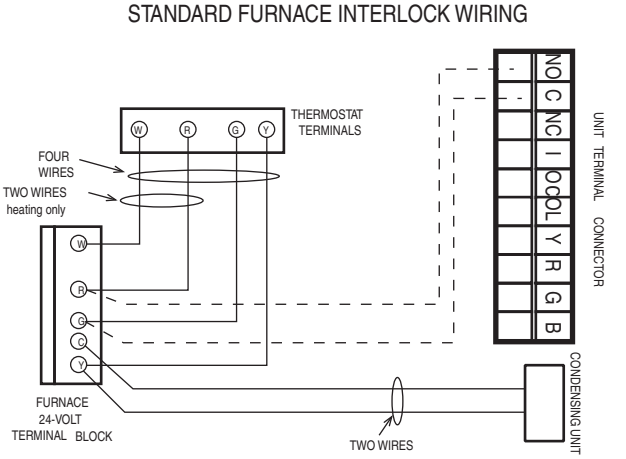

Fig. 10 - Interlock Relay Wiring Layout

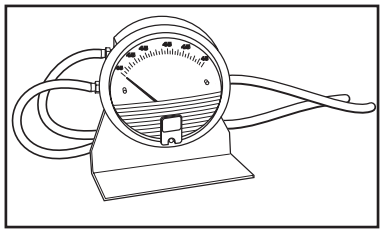

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Fig. 11 - Magnehelic Gage

VENTILATION EVALUATION

⚠ CAUTION

UNIT DAMAGE HAZARD

Failure to follow this caution may result in reduced unit efficiency, capacity or unit life.

DO NOT use HRV during construction of a house or when sanding drywall. This type of dust may damage system.

When ventilation requirement is determined, use Product Data Sheets to reference unit airflow delivery and performance.

The ventilation capacity of an ERV/HRV unit while at maximum speed is defined according to greatest total airflow required. These methods are derived from the Canadian National Building Code 1995 version and the CSA F326.1 revision.

The following 2 methods can be used to evaluate the approximate ventilation needs of a house. Accuracy of calculations are dependent upon the information available and knowing critical measurements of the structure (See Fig. 15).

METHOD 1

To calculate approximate ventilation:

> The sum of rooms X 10 CFM per room, plus 20 CFM for a master bedroom or basement.

Example: 8 rooms X 10 CFM + 20 CFM = 100 CFM.

NOTE: The master bedroom and basement are not included in first part of this equation, but figured in at second part of equation.

METHOD 2

To calculate approximate ventilation:

> Total cu ft X per hr = total. Take total and divide by 60 to get CFM.

Example:
1220 sq ft X 8 ft in height = 9760 cu ft per floor
9760 cu ft x 2 floors = 19520 total cu ft in house
19520 cu ft X .3 air changes per hr = 5856 cu ft
5856 cu ft ÷ 60 minimum per hr = 98 CFM.

Conclusion: The total amount of air flow needed is 98 CFM. This falls within airflow range of a ERVCCSHA1100 size unit.

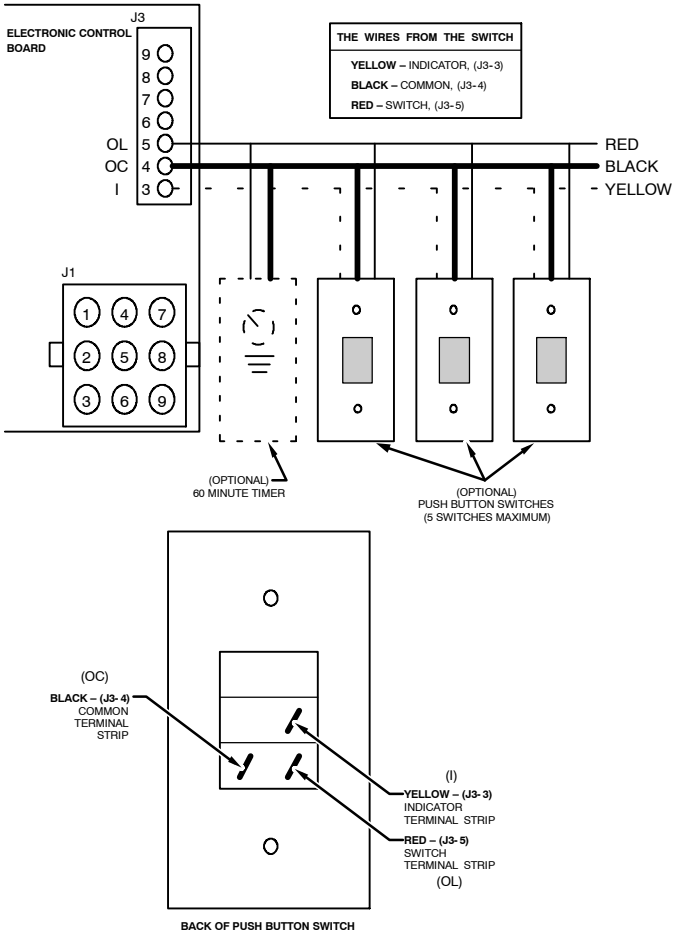

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Fig. 12 – Push Button Timer Wiring Layout

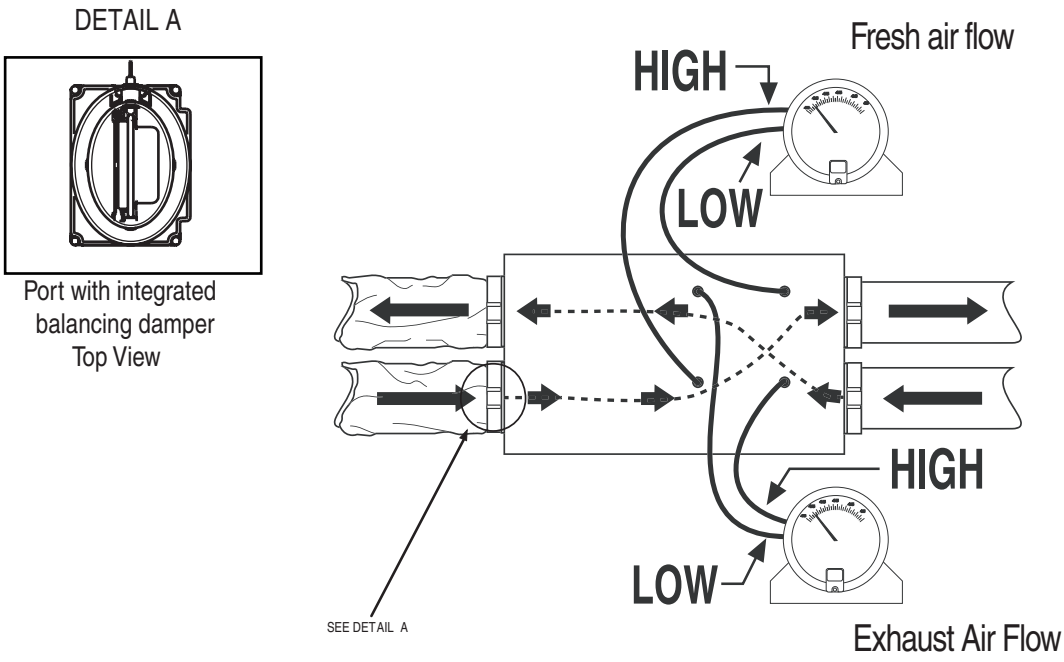

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Fig. 13 – Balancing ERV/HRV

CONTROL BOARD OPERATION

1. Defrost

The ERV/HRV continually monitors the outside air temperature. If the outside air is at or below 23°F(-5°C), the ERV/HRV will initiate a defrost cycle by closing the outside air damper and recirculating warm indoor air through the heat recovery core. This happens every 32 min. with 6 minute defrost cycle. During this process, core is defrosted without the use of electric strip heat. At 5°F(-15°C), unit will defrost for 6 minutes every 32 min. At -17°F(-27°C), the unit will sense a need to defrost every 20 minutes with a 6 minute cycle. See the Troubleshooting section for a control logic explanation.

2. Off and Intermittent/Off Mode

When ERV/HRV is Off, K1 relay is open, and K5 relay is energized which closes outside air damper.

3. High-Speed Air Exchange

When high-speed air exchange occurs, K1 and K2 relays are energized and K5 relay is de-energized. This opens low-speed contacts, and closes high-speed contact on K2 relay. This also opens contact on K5 relay which opens outside air damper. Then, 115vac is applied between orange and gray wires on Molex plug (pins 1 and 6) and blower motor runs in high-speed operation.

4. Low-Speed Air Exchange

When low-speed air exchange occurs, K1 Relay is energized which closes the contacts. K2 and K5 relays are de-energized. This keeps low-speed contacts closed and high-speed contacts open on K2 relay, and opens outdoor air damper. 120vac is applied between Red and Gray wires on Molex plug (pins 1 and 4) and blower motor runs in low-speed operation.

⚠ WARNING

ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury or death.

Before installing or servicing system, always turn off main power to system. There may be more than 1 disconnect switch.

⚠ CAUTION

CUT HAZARD

Failure to follow this caution may result in personal injury.

Sheet metal parts may have sharp edges or burrs. Use care and wear appropriate protective clothing and gloves when handling parts.

CARE AND MAINTENANCE

1. Door

ERV/HRV door can be removed by unlatching brief case style latches, then slide door to the right and remove it from hinges. Door must be in place and secured shut for proper operation.

2. Filter

Filters in ERV/HRV are washable and should be cleaned every 3 months. Use a vacuum cleaner to remove heaviest portion of accumulated dust, then wash in lukewarm water. Allow filter to completely dry before reinstalling. A dirty air filter will cause excessive strain on blower motor. Never operate unit without a filter. Vacuum out debris.

In addition, regularly check and clean screens on exterior intake and exhaust hoods when necessary.

⚠ CAUTION

UNIT COMPONENT DAMAGE HAZARD

Failure to follow this caution may result in unit component damage.

DO NOT clean filters in a dishwasher and DO NOT dry them with a heating appliance or permanent damage will result.

3. Blower Motor and Wheel

ERV/HRV blower motors are factory lubricated for life. Lubricating bearings is not recommended. However, inspect and clean any accumulated dirt and grease from blower motor and wheel annually.

4. Cleaning the Core

ERV is equipped with a special energy recovery core which utilizes a special membrane and allows transfer of sensible and latent energy. The core should always be vacuumed only every 3 months to remove dust and dirt that could prevent transfer of energy (See Fig. 16 and 17).

NOTE: The core should only be serviced when outdoor temperature is between 60°F and 75°F and it is dry.

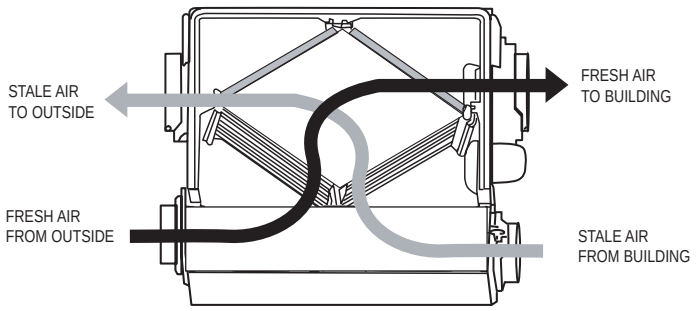

Fig. 14 - ERV/HRV Airflow During Air Exchange

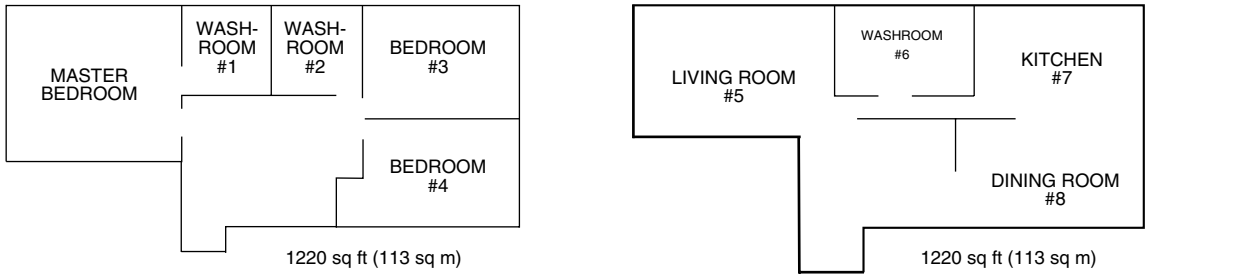

Fig. 15 - Floor Plan Example

⚠ CAUTION

UNIT COMPONENT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage or improper operation.

DO NOT use water to clean core or damage will result. In addition, before servicing or removing the core inspect the edges to see if they appear soft (or slightly expanded). This can be normal and due to moisture in the air. DO NOT handle or service core until it is dry or air passages can become damaged and/or closed.

⚠ WARNING

ELECTRICAL SHOCK HAZARD

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Before installing or servicing system, always turn off main power to system. There may be more than 1 disconnect switch.

⚠ CAUTION

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Sheet metal parts may have sharp edges or burrs. Use care and wear appropriate protective clothing and gloves when handling parts.

TROUBLESHOOTING

NOTE: Reference Table 3 Troubleshooting Chart

This can be a quick guide in resolving unit problems. It is also recommended to review and understand Wall Control Board Operation and Care and Maintenance sections before continuing. There are 3 main parts to focus on when troubleshooting ERV/HRV unit:

1. Wall Control
2. Electronic control board
3. Blower motor

1. Wall Control

Typically, the wall control is either good or it is bad. Use Table 1 to determine if wall control is operating correctly. Use Fig. 9 to check control wire connections.

NOTE: The electronic control board and wall control operate on 12vdc.

2. Control Board

Electronic control board must have wall control attached before unit will function properly (except for units equipped with manual switch such as the new horizontal units). Outside air thermistor must be connected to control board for it to operate properly. See Table 6, Temperature -vs- Ohm Chart, for valid temperature range.

3. Blower Motor

The ERV/HRV blower motor operates on 115vac, with 2-speed operation.

The easiest way to check blower speed operation is to use the wall control and initiate a low-speed blower and high-speed blower operation.

NOTE: If there is a short circuit or an open circuit at thermistor, CPU will go into a 5 minute defrost cycle every 20 minutes. This feature is not there on older board versions with 3pin jumpers.

Table 3—Troubleshooting Chart

SYMPTOMS	CAUSES	SOLUTIONS
Air too humid	Continuous exchange mode used in small houses	Use Intermittent Mode Check humidity level settings
Unit not responding to wall control	Defrost condition is in effect Outdoor temperature is below 23°F	Unit will operate when not in defrost mode. Defrost cycle is based on outdoor ambient (See Table 10)
	Broken control wire	Test wall control Check connections Check thermistor
Unit stops momentarily	Electrical supply interrupted	Check units circuit breaker
Air from distribution register too cold	Improper calibration of air flow	Check calibration of flow rates
Unit makes annoying noise	Ventilation wheel out of adjustment	Remove the motor and screw wheel on properly
Noise level too high at distribution registers when in high speed	Air duct system too short	Install a duct silencer

Table 4—Defrost Cycle

Outside Temperature		HRV Defrost Cycles	
Celcius (°C)	Fahrenheit (°F)	Defrosting (min.)	Operation time (min.) between each defrost cycle
–5 to –27	23 to –17	7	25
–27 and less	–17 and less	10	22

Outside Temperature		ERV Defrost Cycles	
Celcius (°C)	Fahrenheit (°F)	Defrosting (min.)	Operation time (min.) between each defrost cycle
–5 to –27	23 to –17	9	23
–27 and less	–17 and less	10	22

Table 5—System Wiring Colors and Connections

CONTROL MODULE		WALL CONTROL WIRE	WALL CONTROL	
Terminal Block No.	Terminal Block Identification	Color	Terminal No.	Terminal Identification
J3–9	B	Black	J1–4	B
J3–8	G	Green	J1–3	G
J3–7	R	Red	J1–2	R
J3–6	Y	Yellow	J1–4	Y

Override Test

To use override test function, a thermistor must be connected to the control board. Unit must not be in defrost mode during an override test.

HIGH SPEED

1. Disconnect ERV/HRV from 115vac.
1. Unplug wall control wires at control module terminal block inside ERV/HRV.
2. Plug ERV/HRV back to 115vac.
3. Attach a wire across J3-8 and J3-9 (B and G) on control module terminal block.
4. Push in door switch, this will initiate a high-speed exchange.

LOW SPEED

1. Unplug ERV/HRV from 115vac.
2. Disconnect wall control wires at control module terminal block inside ERV/HRV.
3. Plug ERV/HRV back to 115vac.
4. Connect a 3.0 K ohm resistor between B and G on control module terminal block.
5. Push in door switch, this will initiate a low-speed exchange.

4. Blower Speed Selection

Three-speed blowers are factory connected to electronic control board on HIGH- and LOW-speed taps of blowers. Installer can easily change low-speed tap to medium-speed tap so electronic control will select between high and medium speed. Connections can be changed at motor location (See Table 6 and 7).

To change low speed to medium speed, proceed as follows:

1. Unplug unit from 115vac.
2. Locate blower assembly.
3. Locate red wire anb lue wire coming from blower assembly.
4. Unplug red wire from quick connect.
5. Unplug protecting cap quick connection from blue wire and put on red wire coming from blower. The cap is a safety insulator.
6. Connect red wire of main harness to blue wire.
7. Replace wires.

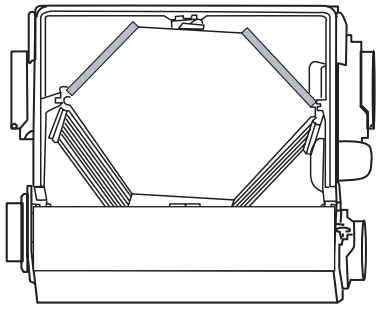

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Fig. 16 - ERV Ports on Side (Bottom View)

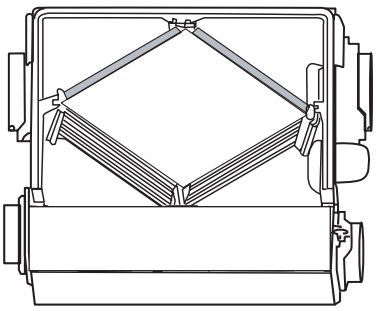

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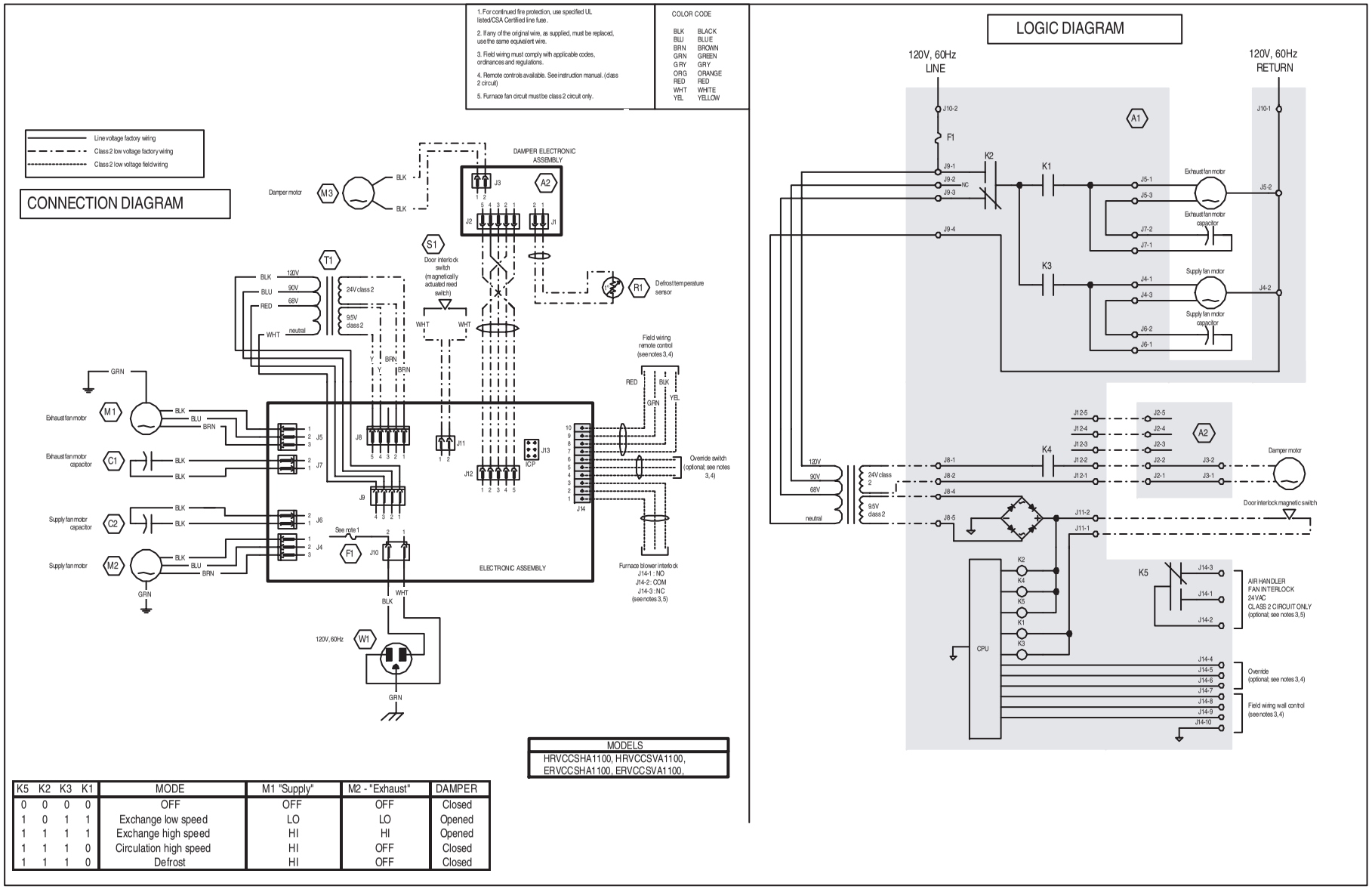
Fig. 17 - HRV Ports on Side (Bottom View)

Table 6—Temperature/Ohm Relationship

Temp. (deg. C)	Rst. (k Ohms)
−50	329.5
−49	310.9
−48	293.5
−47	277.2
−46	262.0
−45	247.7
−44	234.3
−43	221.7
−42	209.9
−41	198.9
−40	188.5
−39	178.5
−38	169.0
−37	160.2
−36	151.9
−35	144.1
−34	136.7
−33	129.8
−32	123.3
−31	117.1
−30	111.3
−29	105.7
−28	100.5
−27	95.52
−26	90.84
−25	86.43
−24	82.26
−23	78.33
−22	74.61
−21	71.10
−20	67.77
−19	64.57
−18	61.54
−17	58.68
−16	55.97
−15	53.41
−14	50.98
−13	48.68
−12	46.50
−11	44.43
−10	42.47
−9	40.57
−8	38.77
−7	37.06
−6	35.44
−5	33.90
−4	32.44
−3	31.05
−2	29.73
−1	28.48
0	27.28
1	26.13
2	25.03
3	23.99
4	23.00
5	22.05
6	21.15
7	20.30
8	19.48
9	18.70
10	17.96
11	17.24
12	16.56
13	15.90
14	15.28
15	14.69
16	14.12
17	13.58
18	13.06
19	12.56
20	12.09
21	11.63
22	11.20
23	10.78
24	10.38
25	10.00
26	9.632
27	9.281
28	8.944
29	8.622
30	8.313
31	8.014
32	7.728
33	7.454
34	7.192
35	6.940
36	6.699
37	6.467
38	6.245
39	6.032
40	5.827
41	5.629
42	5.438
43	5.255
44	5.080
45	4.911
46	4.749
47	4.593
48	4.443
49	4.299
50	4.160
51	4.026
52	3.896
53	3.771
54	3.651
55	3.536
56	3.425
57	3.318
58	3.215
59	3.116
60	3.020
61	2.927
62	2.838
63	2.751
64	2.668
65	2.588
66	2.511
67	2.436
68	2.364
69	2.295
70	2.228
71	2.163
72	2.100
73	2.039
74	1.980
75	1.924
76	1.869
77	1.816
78	1.765
79	1.716
80	1.668
81	1.622
82	1.577
83	1.533
84	1.492
85	1.451
86	1.412
87	1.373
88	1.336
89	1.301
90	1.266
91	1.232
92	1.200
93	1.168
94	1.137
95	1.108
96	1.079
97	1.051
98	1.024
99	0.9984
100	0.9731
101	0.9484
102	0.9246
103	0.9014
104	0.8789
105	0.8572

Table 7—Temperature and Voltage

TEMP °F (°C)	Voltage DC Volts (J4)
−22 (−30)	3.5
−4 (−20)	2.7
4 (−15)	2.3
14 (−10)	2.0
32 (0)	1.4
41 (5)	1.1
50 (10)	0.9
68 (20)	0.6



K5	K2	K3	K1	MODE	M1 "Supply"	M2 - "Exhaust"	DAMPER
0	0	0	0	OFF	OFF	OFF	Closed
1	0	1	1	Exchange low speed	LO	LO	Opened
1	1	1	1	Exchange high speed	HI	HI	Opened
1	1	1	0	Circulation high speed	HI	OFF	Closed
1	1	1	0	Defrost	HI	OFF	Closed

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Fig. 18 - ERV/HRV Wiring Diagram

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